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COST, FAIR VALUE, AND DEPRECIATION RESERVES

Any definition of "fair value," in the sense in which the term is employed by courts and commissions in connection with the valuation of public utility properties, is subject to various limitations and conditions. Moreover, other things being equal, fair value may be different for rate making from what it is for taxation, and fair value for purchase may differ from fair value for rate making or for taxation.¹ In reality, other things usually are not equal. Historical development, financial methods, accounting procedure, and peculiarities of circumstances surrounding individual cases make uniformity of procedure in determining fair value impossible. This accounts for discrepancies in the definitions of fair value which have been submitted to us. However that may be, since the Supreme Court of the United States handed down the decision in *Smyth v. Ames*, in 1898, fair value has been the accepted basis of procedure in the determination of the rights of capital invested in public utilities.²

The adoption of a theory of valuation and the rejection of actual investment as a basis for rate making, whether or not sound from an economic point of view, has greatly complicated the problem of regulation. It has, in part at least, divorced the question from a consideration of those records which are best adapted to supply information regarding the inception and growth of an enterprise, that is, the accounting records. Even though correct accounting methods have been pursued and capital expenditure and expense have been carefully distinguished, the results do not afford a sufficient basis for the solution of the problem of fair

¹ Henry Floy, in *Valuation of Public Utility Properties* (p. 10), says: "The determination of the fair value of a given property to be used as a basis for fixing proper returns or rates to be charged, depends upon the value of the property being used in the service from which the returns or rates are earned and is oftentimes quite different from the fair value of the total property of any utility, part of which may be held for future extensions or profit or use for extraneous purposes, but all of which have to be considered and allowed in case of capitalization or purchase or sale, as a whole."

²The correctness of this decision has been seriously questioned. Thus James E. Boyle says: "It was a judicial error—and one of the first magnitude—that gave us the doctrine of valuation instead of investment as the basis of rate making." *AMERICAN ECONOMIC REVIEW*, SUPPLEMENT, vol. IV (March, 1914), p. 54. See the criticism of Professor H. C. Adams in his *Railway Accounting*.

value. The science of accounts proceeds from an investment or cost basis where fixed and wasting assets are concerned. The Supreme Court has rejected cost as the exclusive basis for determining fair value in rate cases. It has said that, in determining fair value of a property, "original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stocks, the present as compared with the original cost of construction, the probable earning capacity under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration and are to be given such weight as is just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property."³

An adequate conception of fair value, as thus defined, must take account of various and complicated conditions. Rules which establish a "fair value" which is fair to a new company may be unjust to an old one.⁴ Questions sometimes arise as to the inclusion of certain items in fair value, such, for example, as surplus,⁵ unearned increment,⁶ going value,⁷ unearned depreciation,⁸ and depreciation reserves.

Most of our utility companies either have not established depreciation reserves, on the theory that repairs are equivalent to depreciation, or have set up reserves which are entirely inadequate. Failure to establish adequate reserves may be ascribed to various reasons. There is a belief on the part of some utility managers and utility accountants that depreciation reserves are prejudicial to the interests of their companies and that in a valuation these reserves will in some manner be manipulated to lessen fair value. Moreover, some writers have attempted to show that depreciation reserves are worse than useless because they tie up funds which are not needed in the business and which ought either to be returned to the investor as dividends or employed in making extensions and improvements.

There is much sophistry and some truth in these contentions. Repairs are not equivalent to depreciation, although in some plants

³ *Smyth v. Ames*, 160 U. S. 466 (1898).

⁴ See H. V. Hayes, *Public Utilities*, vol. II, p. 16.

⁵ AM. ECON. REV., SUPP., vol. IV (Mar., 1914), p. 33.

⁶ Hayes, *Public Utilities*, vol. II, pp. 26-32, 41.

⁷ HENRY FLOY, *Valuation of Public Utilities*, p. 17.

⁸ L. R. NASH, *Valuation of Public Service Properties*, p. 4.

possessing a great extent and variety of assets "repairs" may be made to include extensive replacements without putting an undue burden upon the revenues of any year or period of years. Depreciation reserves are not prejudicial to the best interests of public utility companies but on the contrary are one of the best safeguards against insolvency. It is true that the improper treatment of depreciation in valuations has injured some utility interests. But depreciation reserves are not useless. Ordinarily they do not tie up money which ought to be usefully invested. Perhaps there may be found instances where excessive reserves have been established, others where the reserves have been misused, and others where improper regulations or a failure to understand their true character have prevented their most advantageous use.

The purpose in making reservations for depreciation is to bring into profit and loss a charge equivalent to the current fiscal period's "expired outlay on plant." This is such a part of the *cost* of wasting assets as a fair judgment informs us represents the expired outlay on plant for such fiscal period. It is not within the scope of this paper to discuss the various methods employed for allocating depreciation expense over fiscal periods, except to note that the sum to be allocated is cost-less-salvage and that the time during which such allocation is made is the useful life of the asset in question. The theory that underlies this procedure is so well known, so widely advocated by professional accountants, and so clearly recognized in income tax procedure in England and in the United States that further elucidation of it here is unnecessary.

Certain fundamental considerations apropos of the question of fair value arise from the fact that accounting—and therefore depreciation reserves—always refers back to cost. Accounting, in so far as it deals with wasting assets productively employed, ignores fluctuations in market prices. Being based on cost, it also ignores fluctuations in the purchasing power of money. Thus, if a machine was installed in 1910 at a cost of \$1,000 and possessed a useful life of ten years, it is correct accounting practice to charge off \$1,000 less salvage and to establish a reserve for that amount, although it may cost, possibly, \$1,500 to replace the machine in 1920.

The additional \$500 required to make the replacement must be provided as an additional investment. This means that during periods of rising prices depreciation reserves which amortize the

cost of wasting assets are inadequate for making replacements. Additional capital must be invested to make up the difference between replacement cost and the cost of the parts replaced. Investment in plant, rolling stock, and machinery is crystallized and cannot be varied to reflect increasing or decreasing market prices by means of adjustments made from time to time in the accounts.

Over extended periods of time the swing of the price pendulum may serve to compensate such inequalities to a certain extent but it is not likely to bridge the distance between former costs and present values of land. At best, therefore, we cannot always hope to harmonize original investment with fair value, and accounts, even though properly kept, do not afford all the information needed to determine fair value as it is defined by the Supreme Court.

A scheme of accounting which throws an enterprise out of adjustment with actual conditions may seem to be subject to severe criticism; but there are reasons why accounting must proceed from a cost basis. To adopt a different plan would be to reject one of its most fundamental tenets, namely, that profit and loss must be realized, not mere adjustments on paper. Not even stock in trade can be written up before it is sold, and for a manager to list his inventories above cost gives rise to the question of his good faith. The Bureau of Internal Revenue has pursued the settled policy of deducting as expense "that amount which should be set aside for the taxable year in accordance with a consistent plan by which the aggregate of such amounts for the useful life of the property in the business will suffice, with the salvage value, at the end of such useful life to provide in place of the property its cost."⁹ Assets of the most permanent character are ordinarily the ones which necessitate the heaviest outlays of capital. These possess a useful life sufficiently long to render impossible an attempt to keep recorded value in agreement with market value.

Depreciation reserves have one chief purpose—the return, through revenues, of the cost of assets during their useful lives.

If prices rise, the investor loses; if they fall, he gains, because in the former case the amount returned is not sufficient to replace in kind and in the latter case it is more than sufficient. As this is a risk which all capital takes it appears that in determining fair value the investor who loses owing to rising prices should not be

⁹ Regulations 45, art. 161.

compensated for his loss nor should he who gains owing to falling prices be deprived of his gain.

Omitting further consideration of discrepancies in depreciation reserves resulting from changing cost of replacement, we may ask: How is the depreciation reserve related to fair value? Does the depreciation reserve aid in determining fair value, when it exists? If so, is it part of fair value or ought it to be deducted in arriving at fair value? Do the same answers hold for fair value in any case, whether for rate making, taxation, or purchase?

Previous considerations have shown that the depreciation reserve does not determine fair value, because it is based on cost. Were it accepted as the sole criterion it would be necessary to exclude consideration of fluctuating values, unearned increment, going concern, and the like. It would limit the use of the word value to cost-less-depreciation or to cost, according as the depreciation reserve is or is not a proper deduction. Broadly interpreted, fair value would be determined with reference to past, not present, conditions. We can hardly conceive a plan which determines all elements of value with reference to costs.

Smyth v. Ames rests the matter on general conceptions and suggests the difficulty of any fixed standard of valuation. It shows, as do most broad decisions, that there may be no generally controlling factor. The problem cannot be solved by *a priori* methods because each case presents individual peculiarities.

Depreciation reserves have figured extensively in valuations. The following instances may be noted. Commissioner Eshleman, of the California Railroad Commission, has rendered an opinion to the effect that earnings should not be permitted on the depreciation reserve, even when it is invested in extensions.¹⁰ This is substantiated in *Louisiana Railroad Commission v. Cumberland Telephone and Telegraph Co.*;¹¹ also in *Louisville and Nashville R. R. Co. v. Railroad Commission of Alabama*,¹² in which the special master said: "But however that may be, the management is entitled to the whole capital at 100 per cent of value and the (apparent) replacement balances at any moment stand precisely as a part of the capital—that is, as value expended by use and replaced by depreciation assessments in transit for renewal investment." If the reserve is deducted from cost of assets to de-

¹⁰ Whitten, *Valuation of Public Service Corporations*, vol. II, p. 1186.

¹¹ 212 U. S. 414 (1909). See Hayes, *Public Utilities*, vol. I, pp. 224-227.

¹² Whitten, vol. II, p. 1188.

termine depreciated value, and earnings are permitted on the depreciated value only, then earnings should be allowed also on the reserve. On this point the court in the last case cited above said: "But as pointed out in argument, the net results of operation, including operating expenses, are in this instance allowed credit for interest on depreciation, because the full amount of accrued depreciation is deducted from the value of property on which return is claimed."

This is equivalent to allowing a return on original cost, which, according to the investment theory, is correct if all capital invested is "used and useful" and if capital has not been reduced. Present cost new is larger than original cost new by the amount of the reserve invested in additions or betterments and upon this excess no return should be earned. To permit a return on the reserves in addition to a return on cost is equivalent to capitalization of the reserve.¹³

Assume the case of a utility having assets representing an investment of \$5,000,000; capital stock outstanding, \$3,000,000; first mortgage bonds, \$1,500,000; and other liabilities, \$500,000. The balance sheet at the close of the construction period stands thus:

Non-depreciating assets...	\$2,000,000	Capital stock	\$3,000,000
Depreciating assets	3,000,000	First mortgage bonds.....	1,500,000
		Other liabilities	500,000
	<hr/>		<hr/>
	\$5,000,000		\$5,000,000

Assume, further, that the wasting or depreciating assets are divisible into four classes, as follows:

¹³ There is an exception to this rule in case the sinking fund method is employed. Then the amounts set aside for depreciation are presumed to earn interest which is added to the fund. Whether or not a fund is actually set aside, the company must sacrifice the interest necessary to create a reserve which will ultimately be as large as the straight line method would provide. Consequently the reserve ought not to be deducted in arriving at fair value. The company loses the interest on the amount of the reserve, hence it would be unjust to deduct it from original cost in ascertaining fair value. It would appear, however, that where the reserve actually earns more than the rate allowed for under the sinking fund method there should be deducted the capitalized value of such excess. In accordance with this principle E. W. Bemis recommended cost new in the Chicago Telephone case. Commissioner Stevens of the New York Public Service Commission, 2nd District, makes a similar recommendation (Whitten, vol. II, p. 1165).

COST	LIFE	ESTIMATED SALVAGE	YEARLY DEPRECIATION
\$400,000	6 years	\$40,000	\$60,000
600,000	10 "	30,000	57,000
1,000,000	15 "	40,000	64,000
1,000,000	25 "	200,000	32,000
<hr/> \$3,000,000		<hr/> \$310,000	<hr/> \$213,000

This means that, following the straight line method of writing off depreciation, profit and loss will be charged, each year, \$213,000, and a corresponding credit of \$213,000 will be entered in the depreciation reserve account. It is, of course, impossible in practice to subdivide wasting assets into definite classes, each class having a fixed useful life. Some replacements will be made long before the expiration of six years and these will tend to increase gradually until the plant arrives at a condition of normal depreciation. To simplify calculations, assets are arbitrarily divided into four classes shown above.

According to our assumptions, at the end of the sixth year the depreciation reserve will stand credited with $6 \times \$213,000$, or \$1,278,000. At this time class one of the wasting assets will be retired, being charged against the reserve at cost-less-salvage, or \$360,000, leaving in it a credit balance of \$918,000. At the end of the tenth year the reserve will have a credit balance of \$918,000 + $(4 \times \$213,000)$, or \$1,770,000. At this time class two of the wasting assets will be retired, being charged at cost-less-salvage (\$570,000) against the reserve, leaving in it a credit balance of \$1,200,000. The following table shows the status of the reserve at times when replacements are made, to the end of the twenty-fifth year, when every class of assets will have been replaced one or more times:

	DEPRECIATION RESERVE	RETIREMENTS CHARGED TO RESERVE	BALANCE IN RESERVE
End of sixth year.....	\$1,278,000 less	\$360,000 leaving	\$918,000
End of tenth year....	1,770,000 "	570,000 "	1,200,000
End of twelfth year...	1,626,000 "	360,000 "	1,266,000
End of fifteenth year..	1,905,000 "	960,000 "	945,000
End of eighteenth year	1,584,000 "	360,000 "	1,224,000
End of twentieth year.	1,650,000 "	570,000 "	1,080,000
End of twenty-fourth yr.	1,932,000 "	360,000 "	1,572,000
End of twenty-fifth yr.	1,785,000 "	800,000 "	985,000

In this assumed illustration the reserve varies considerably from period to period. It tends, however, to approach a status of normal depreciation. In a large plant where the replacements are sufficiently numerous to spread the charges against the reserve evenly over successive periods the reserve undergoes a steady

growth, but at a constantly diminishing rate, until the plant arrives at a condition of normal depreciation, after which the reserve remains stationary because abandonments offset reservations. This is only theoretically true, of course, because in practice, even in case of the largest plants, replacements vary somewhat from year to year. The accompanying chart shows graphically, *AB*, the growth of the reserve in our assumed illustration; also the growth of an ideal reserve, which is an evenly progressive curve, *AC*, because the replacements are spread evenly and in increasing amount until, at about the twenty-eighth or thirtieth year, they exactly offset the amount set aside for depreciation. At this point the plant is said to have arrived at a condition of normal depreciation. Normal depreciation amounts to about \$1,630,000. The reserve remains at this figure, after the condition of normal depreciation has been reached at about the end of the thirtieth year.¹⁴ Assuming that this amount represents the ultimate normal depreciation in case of the utility company and that it is reached at the end of the thirtieth year, the balance sheet might then appear as follows:

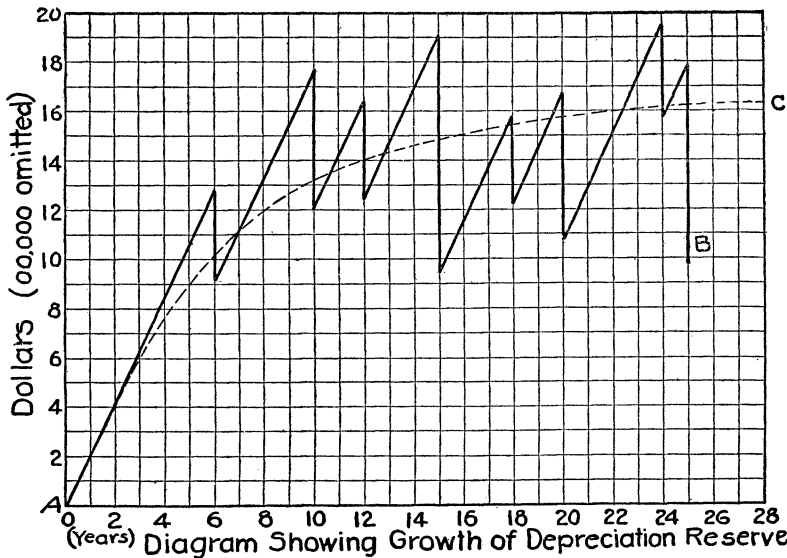
Non-depreciating assets...	\$2,000,000	Capital stock	\$3,000,000
Depreciating assets (original)	3,000,000	First mortgage bonds.....	1,500,000
Depreciating assets (reserve invested).....	1,630,000	Other liabilities	500,000
		Reserve for depreciation..	1,630,000
	<hr/>		<hr/>
	\$6,630,000		\$6,630,000

All items are purposely unaltered with the exception of the introduction of the depreciation reserve and the account representing the investment of the reserve in extensions to property.

Comparison of this balance sheet with the preceding one indicates that "cost" of property is increased from \$5,000,000 to \$6,630,000, 32.6 per cent of the original investment, or 24.6 per cent of total investment (original plus reserve). Of the total cost of property nearly one fourth has been paid out of the depreciation reserve. However, the relative size of the reserve is not pertinent to this discussion.

The depreciation reserve is a valuation account. Appearing frequently on the liability side of the balance sheet, it is apt to be

¹⁴ Since the illustration given is hypothetical, the time, amounts, and percentages do not in themselves have any special significance. These will naturally vary, in any actual case, with conditions peculiar to the plant. In the diagram curve *AC* is assumed and is not directly related to the data from which *AB* is drawn.



confused with surplus. Such a conception of depreciation is as wrong as is the notion that depreciation ought to be or can be set aside from net profits. Unless gross revenue is charged with a reasonable amount to cover both realized and accrued depreciation, net profits cannot be ascertained. When such a charge is made a smaller amount is carried to the surplus or dividends payable account than would be the case were no reservation made for depreciation. It prevents the distribution of capital as dividends. The increase in cost of assets, amounting to \$1,630,000, does not represent an additional investment on the part of the stockholders or bondholders. It simply offsets accrued depreciation of partially worn out units of plant.

The fact that original plant is 32.6 per cent worn out does not mean that it is giving less efficient service than when new. Its efficiency ought to continue unimpaired and perhaps increase. It is for this reason that the company should receive a fair return, not on the depreciated value of the original plant, but on its cost, plus or minus any amount which considerations not related to this discussion may make equitable. A return ought not to be earned on the reserve, however, because it offsets the accrued depreciation which is not deducted in the balance sheet.

It has been stated that the reserve is the property of the pub-

lic and therefore should not be permitted to earn a return. This is erroneous. The amount reserved is definitely the property of the company returned through the rates to offset accrued depreciation on plant but which has not been deducted from cost. If the accrued depreciation were deducted from cost of plant in determining fair value then, on the contrary, extensions financed out of depreciation reserves ought to be included in fair value.

Certain corollary considerations arise, as follows:

- (a) When revenues have not been sufficient to afford a fair return and also to establish depreciation reserves, so that no reserve has been set up.
- (b) When revenues have been sufficient to afford a fair return and also to establish depreciation reserves, but no reserve has been set up.
- (c) When the reserve is employed to amortize capital.

The situation suggested in (a) is analogous to that of many public utilities. If, in such cases, accrued but unearned depreciation is deducted in determining fair value the investment is depleted, because no offset to accrued depreciation exists in the form of extensions, betterments, or investments, paid out of the reserve. The company has consumed capital to pay running expenses and no allowance is made for this in fixing fair value. If the depletion in capital has been caused by mismanagement the loss should not be capitalized; otherwise it should be included in fair value.

When, as in (b), depreciation has been earned but distributed, it should be deducted from cost in determining fair value. Not to deduct it is to permit the company to capitalize that which it has returned to its stockholders. Carried to its logical conclusion this is equivalent to allowing rates sufficiently high to cover depreciation, permitting the company to distribute it, and then replacing the plant free of cost to the company when worn out.

When, according to (c), the reserve is employed to amortize capital, depreciation should be deducted in determining fair value. The legitimate use of the reserve is to serve as an offset to accrued depreciation. If it is used to amortize capital the equity of the owners is reduced to that extent. They cannot expect to secure a return on what they originally invested, for allowance must be made for what has been returned to them.

This paper has been written with special reference to fair value

for rate making. Fair value for purchase or taxation may not be the same as fair value for rates; indeed, it is not likely to be the same. The qualification of "used and useful" may not apply. In so far as fair value is determined by the depreciation reserve it does not ordinarily vary, however, whether for rate making, purchase, or taxation. The reserve represents wealth only vicariously, because there is a corresponding decline in service value in original investment which is not reflected in the asset accounts.

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